

Status of  
New Ozone and Fine Particle (PM 2.5)  
Air Quality Standards  
and  
IDEM's Diesel Initiative

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Office of Air Quality  
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# **What Are the New Air Quality Standards?**

**July 1997, U.S. EPA issued new air quality standards for ozone and fine particles.**

**The new standards are meant to be more protective of sensitive populations which include children, people with respiratory illnesses or heart or lung disease, and seniors.**

**These new standards are:**

**For Ozone - 85 parts per billion measured over an 8-hour period**

**For Fine Particles:**

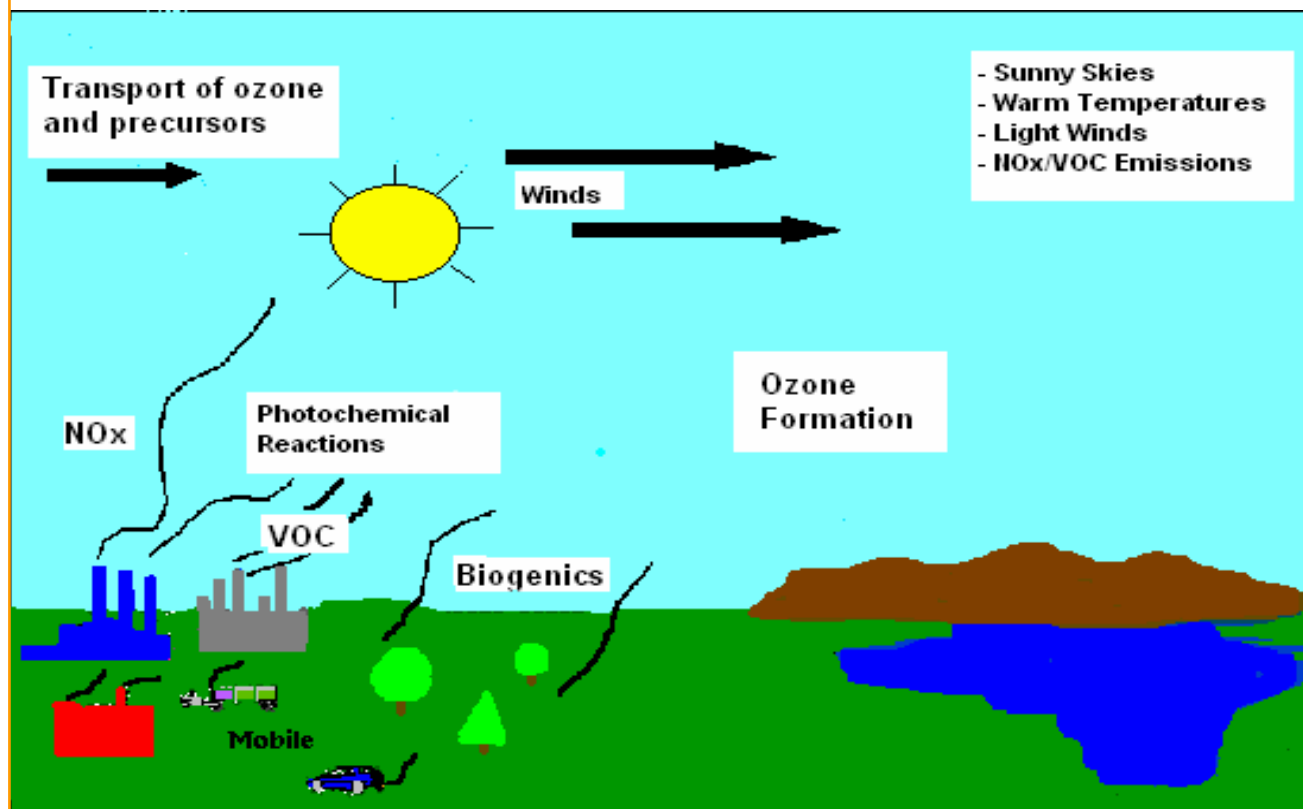
**Annual Standard:                      15  $\mu\text{g}/\text{m}^3$**

**Daily Standard:                        65  $\mu\text{g}/\text{m}^3$**

**Both standards are determined by a three year average.**

# What Is Ozone ?

Ozone is a gas that forms in the atmosphere when 3 atoms of oxygen are combined ( $O_3$ ). It is not emitted directly into the air, but at ground level is created by a chemical reaction between oxides of nitrogen ( $NO_x$ ), and volatile organic compounds (VOC) in the presence of sunlight. Ozone has the same chemical structure whether it occurs high above the earth or at ground level and can be good or bad, depending on its location in the atmosphere.



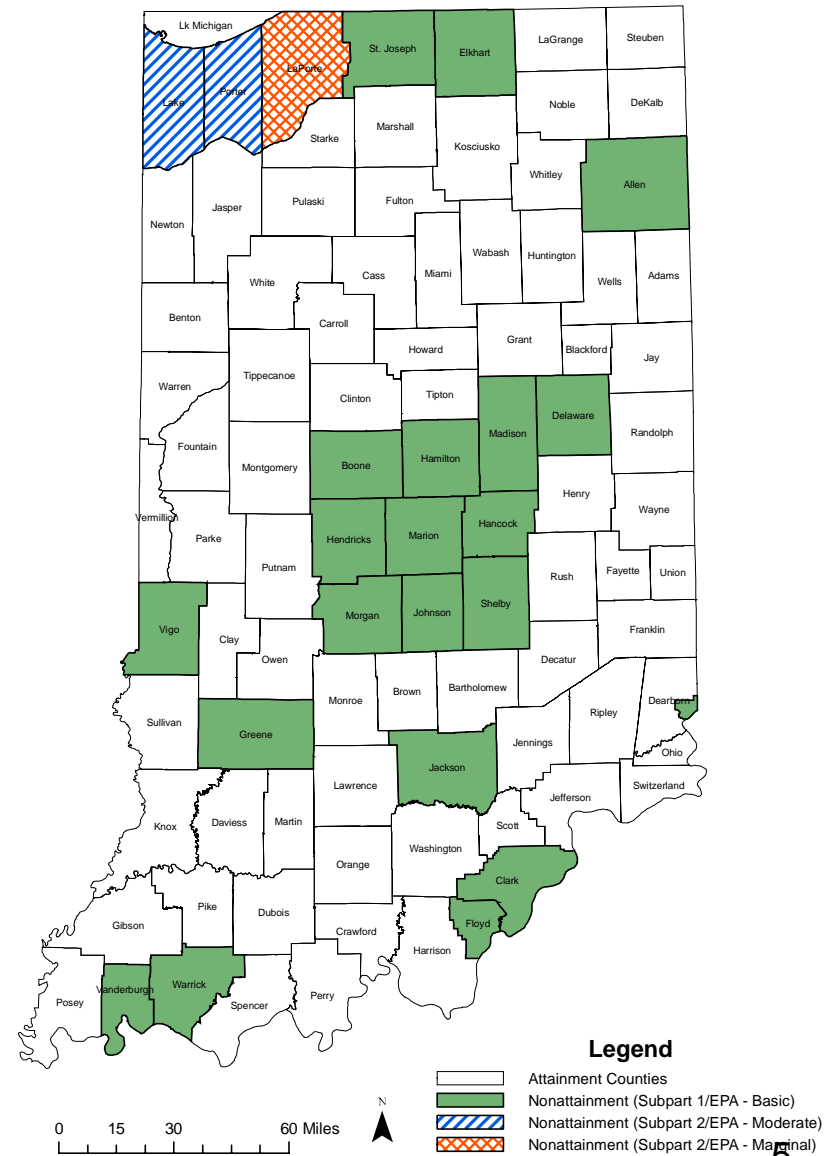
# How Does Ozone Affect Human Health?

- **Inflammation and irritation of the respiratory tract**
  - Symptoms can include coughing, throat irritation, and breathing difficulty
- **Asthma - can induce and aggravate asthma**
  - Asthma death rate has tripled in past 20 years.
  - 40% of asthma cases are children (25% of population)
- **Reduced lung capacity**
  - Increases susceptibility to lung infections, allergens and other air pollutants
  - Damages lung tissue, much like a sunburn, and recovery may take several days
- **Sensitive People:**
  - Children, outdoor workers, seniors, and people with respiratory disease.
  - People who experience effects at lower ozone concentrations are likely to experience more serious effects at higher concentrations.

# U.S. EPA's Final Ozone Nonattainment Designations for Indiana

April 15, 2004

## Indiana Nonattainment Counties for the 8-Hour Ozone Standard

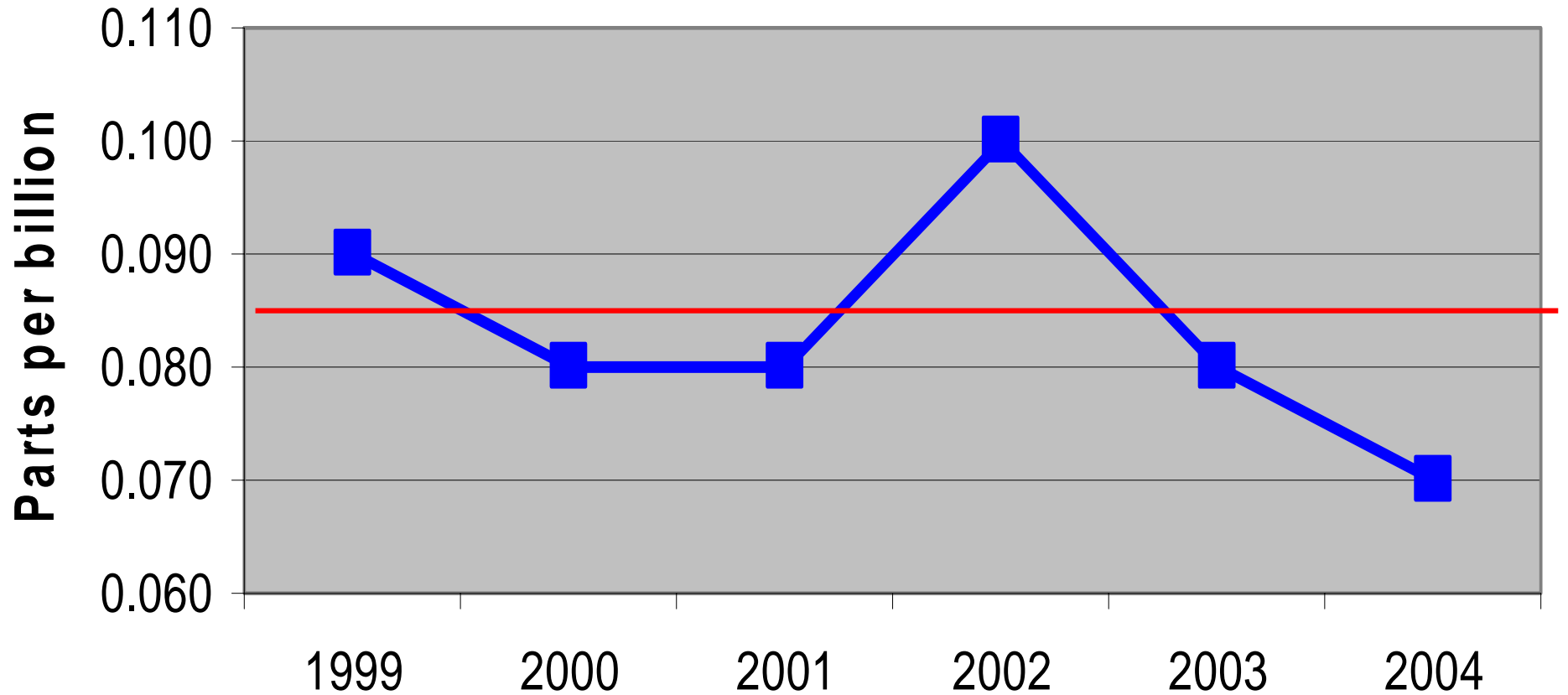


# Implementation Milestones for Ozone

<b>Requirement</b>	<b>Basic/Subpart 1 (most Indiana counties)</b>
<b>Final Designations</b>	<b>April 15, 2004</b>
<b>Effective Date of Designations</b>	<b>June 15, 2004</b>
<b>Attainment Deadline</b>	<b>June 15, 2009</b>
<b>Attainment SIP Deadline</b>	<b>June 15, 2007</b>
<b>Vehicle Emissions Testing</b>	<b>Not Required</b>

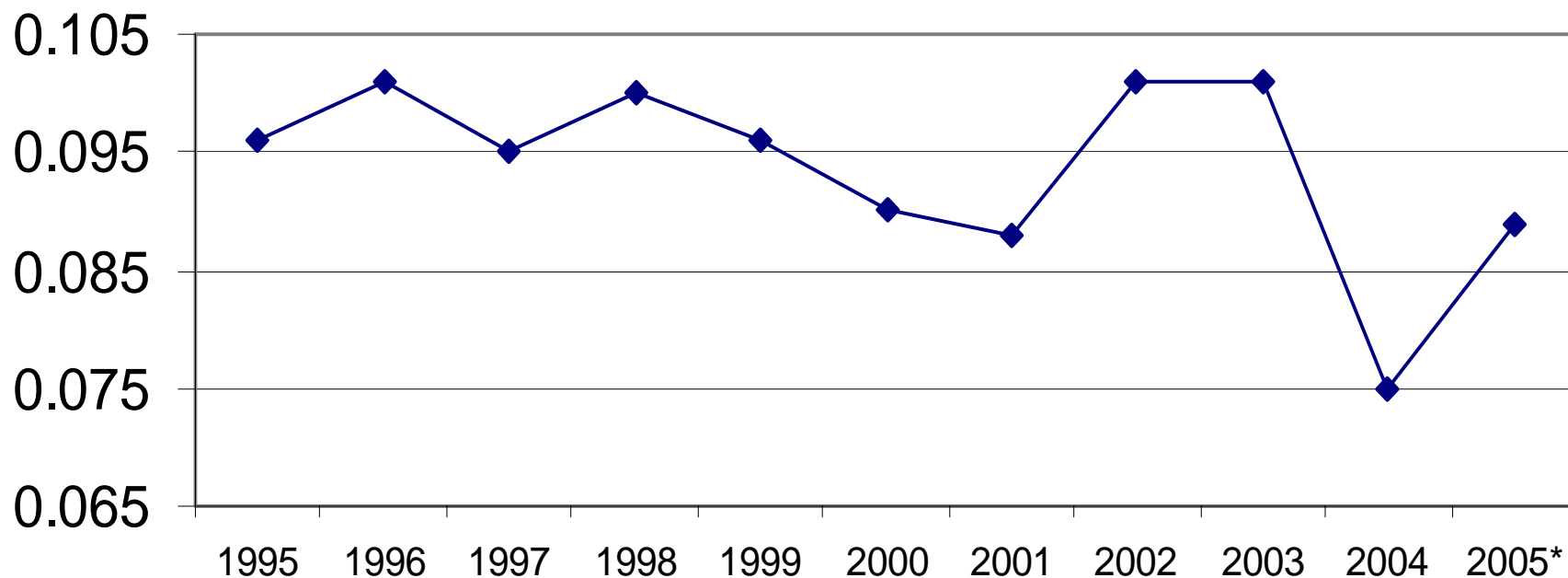
**Note: U.S. EPA expected to issue Phase II of the Final Implementation Rule for Ozone this summer.**

# Statewide Annual Ozone Average Value



# 2005 8-Hour Ozone Status For Central Indiana

**Annual 4th High 8-Hour Ozone Values  
Noblesville (In PPM)**



\*Based on data through 8/1/05.

# **Redesignations for Ozone**

**Counties eligible for redesignation to attainment/maintenance:**

**Delaware**

**Vanderburgh**

**Greene**

**Vigo**

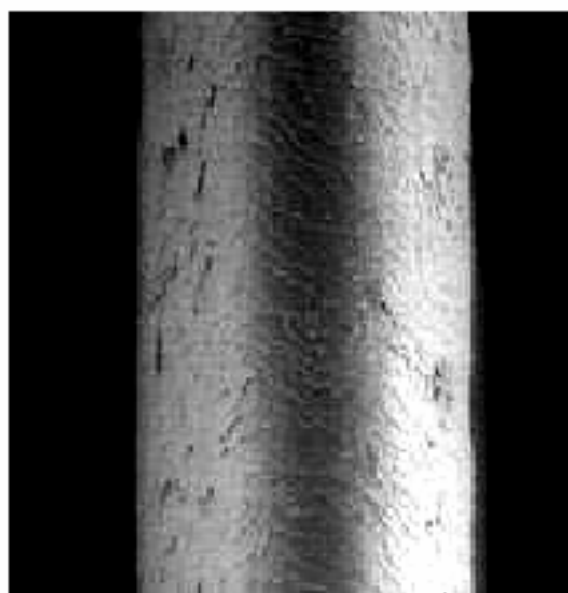
**Jackson**

**Warrick**

- Draft redesignation petitions and maintenance plans are complete for all areas.**
- Public hearings will be complete 8/15/05.**
- All final submittals will be made by September 1, 2005.**
- U.S. EPA approvals should be issued late this year.**

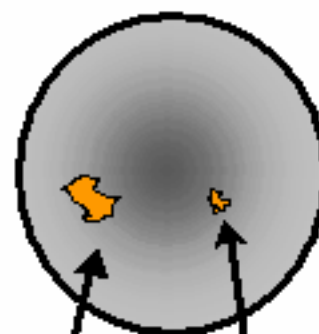
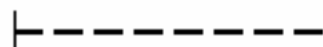
# What are Fine Particles?

**A complex mixture of extremely small solid particles and drops of liquid in the air**



Human Hair (70  $\mu\text{m}$  diameter)

Hair cross section (70  $\mu\text{m}$ )



$\text{PM}_{10}$   
(10  $\mu\text{m}$ )

$\text{PM}_{2.5}$   
(2.5  $\mu\text{m}$ )

# Where Do Fine Particles Come From?

Wood-Burning Stoves



Power Plants



Heavy Duty Diesel Engines

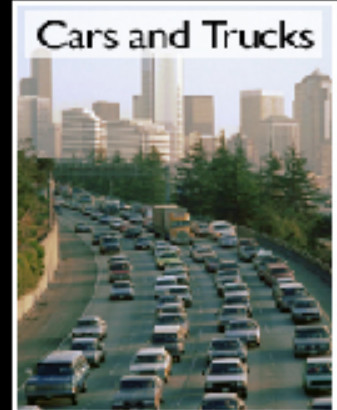


Natural Sources



**Fine Particles Can Be  
Emitted Directly or Formed  
in the Air from Gases**

Cars and Trucks



Non-Road Vehicles



Forest Fires



Industrial Sources



# Fine Particles Reduce Visibility



**Indianapolis on a Clear Day**  
**Summer of 2003**



**Indianapolis on a Hazy Day**  
**Winter of 2005**

Photo: Midwest HazeCam

# How Can Fine Particles Affect Your Health?

## Minor symptoms:

Irritation or eyes, nose, and throat

Coughing

Excess phlegm

Chest tightness

Acute bronchitis

Increased susceptibility to  
respiratory infections

## More serious symptoms:

Asthma attacks

Shortness of breath

Palpitations

Unusual fatigue

Heart attacks

Premature death

## Sensitive Groups:

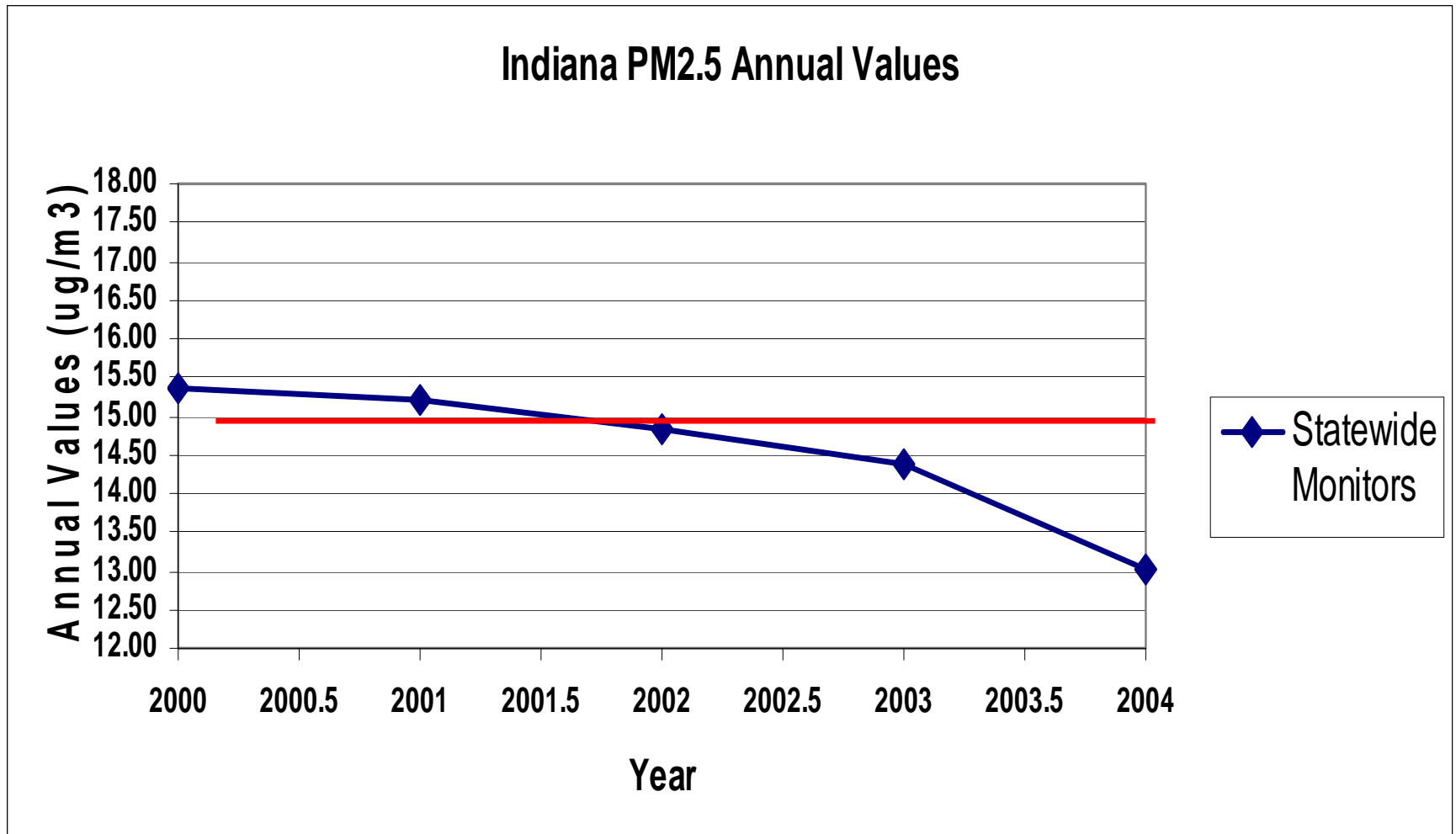
Children

Seniors

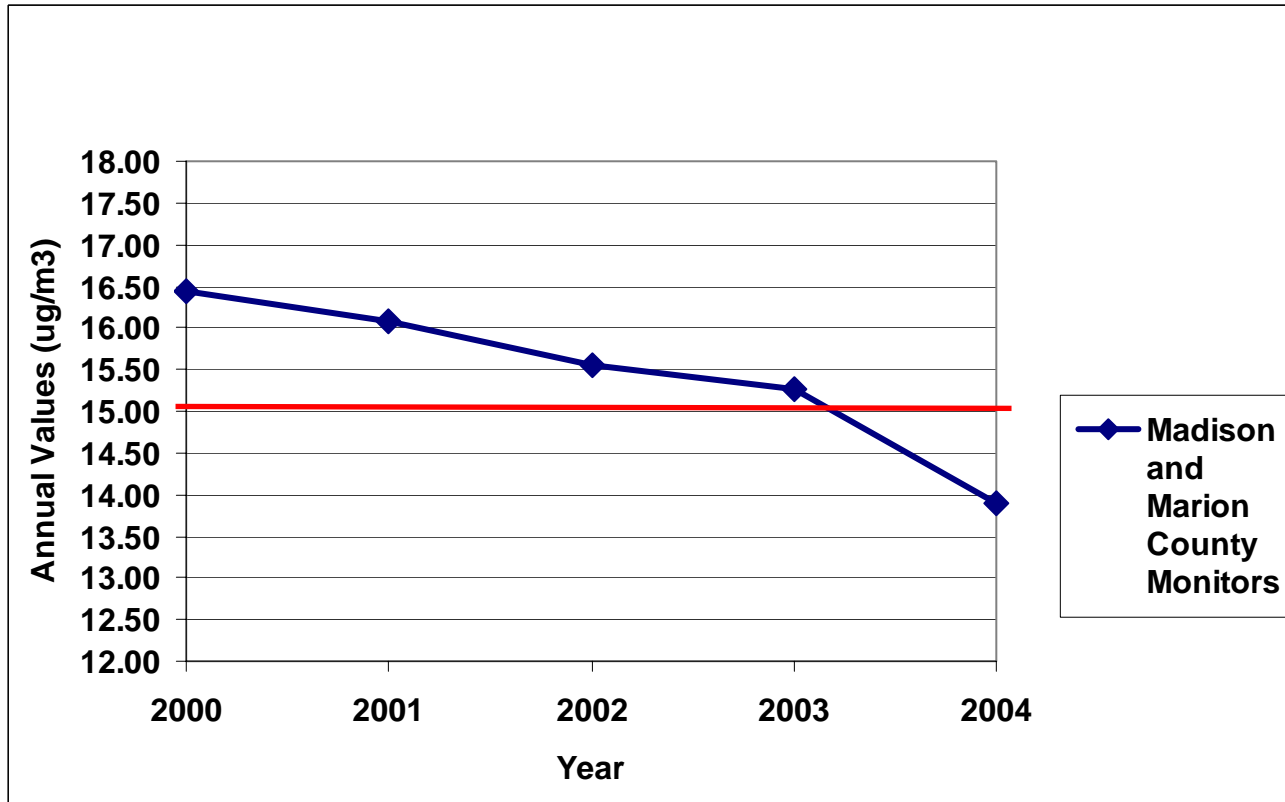
People with heart or lung disease

Outdoor workers

# Statewide PM2.5 Averaged Monitor Trend



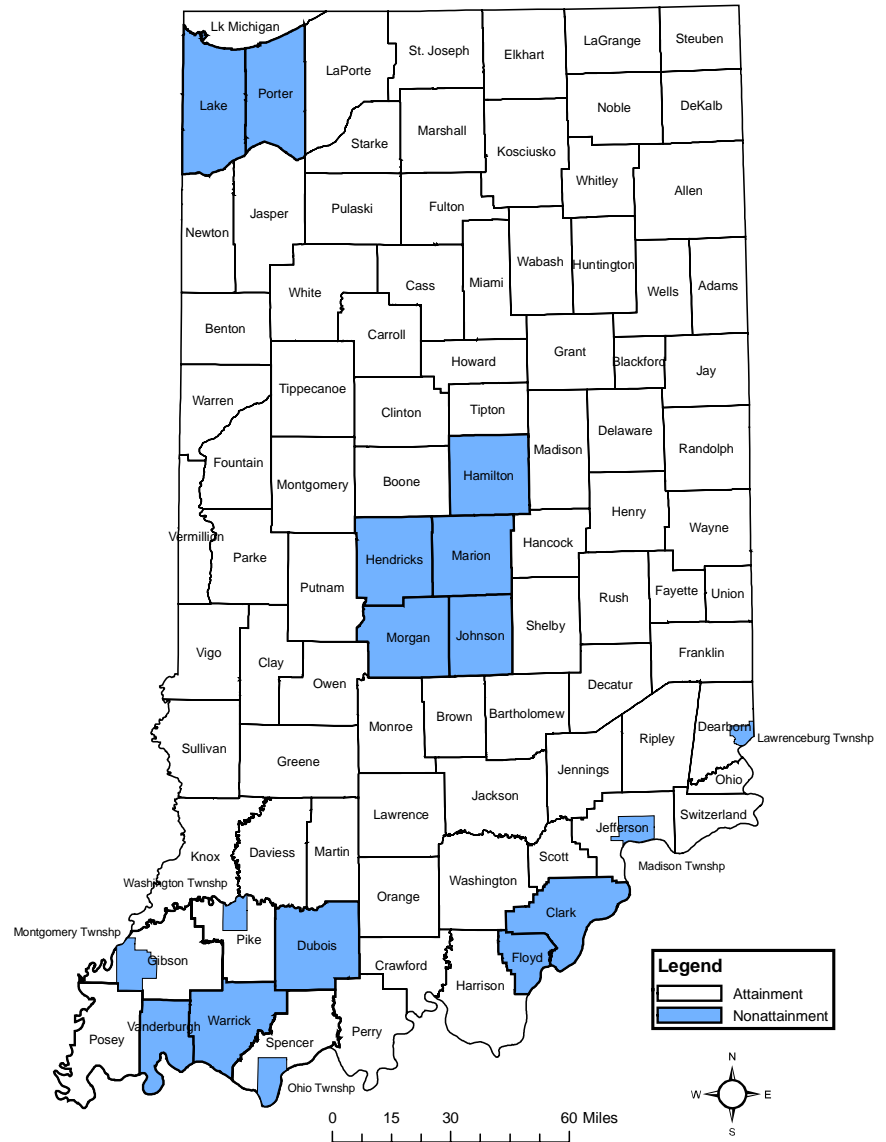
# Central Indiana PM 2.5 Annual Values



U.S. EPA Final Designations for Fine Particle "PM 2.5" Standard  
April 2005

# U.S. EPA Final Designations for Fine Particles

April 5, 2005

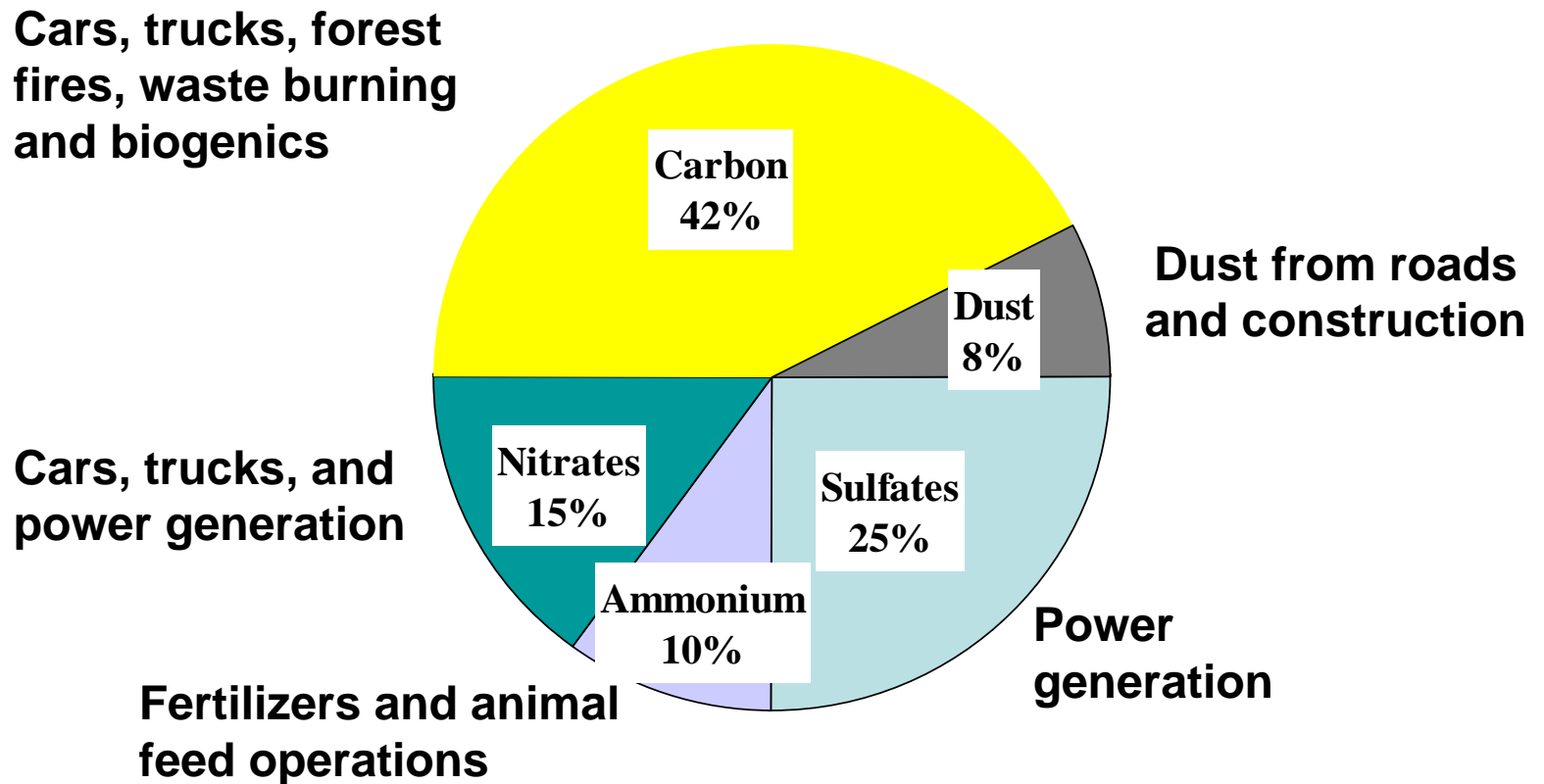


# Implementation Milestones for Fine Particles

<b><u>Requirement</u></b>	<b><u>Basic/Subpart 1</u></b>
<b>Final Designations</b>	<b>December 17, 2004</b>
<b>Effective Date for Designations</b>	<b>April 5, 2005</b>
<b>Attainment Plan Deadline</b>	<b>April 5, 2008</b>
<b>Attainment Deadline</b>	<b>April 5, 2010</b>

**Note: U.S. EPA may publish draft implementation rule by December 2005, and final rule by December 2006.**

# **Estimated Source Contribution to Fine Particle Levels\***



\*Source: U.S. EPA 2002 National Averages

# **What Measures Will Improve Air Quality?**

## **Federal Measures “on the books” to be Implemented Prior to 2007:**

- **NOx SIP Call (Indiana’s NOx Reduction Rule)**
- **Tier II motor vehicle engine standards**
- **Low Sulfur Gasoline Standards**
- **Heavy Duty Diesel Engine Standards**
- **Ultra Low Sulfur Diesel Fuel Standards**
- **Non-road Diesel Engine and Low Sulfur Fuel Rule**
- **Clean Air Interstate Rule-Signed on March 10, 2005**

# Areas Likely to Require Additional Controls

- Based on air quality modeling to date, it appears that additional emission reductions may be required in order for Northwest and Central Indiana to attain the new standards.
- Air Quality advisory groups established and active in reviewing control options and devising a recommended control strategy.
- Central Indiana  
<http://www.in.gov/idem/air/ciaqag/index.html>
- Northwest Indiana (Lake and Porter Counties)  
<http://www.in.gov/idem/air/nirpc/index.html>

# Basis for Federal and State Diesel Initiatives

- Diesel emissions are harmful to public health
- Diesel exhaust releases particulate matter that contributes to the formation of ground level ozone, acid rain, and even climate changes
- Health symptoms ranging from irritation of the eyes and nose to asthma and chronic bronchitis have been associated with exposure to diesel exhaust
- U.S. EPA describes diesel engine exhaust as *likely to be carcinogenic to humans* by inhalation from environmental exposures

# Basis for Federal and State Diesel Initiatives

- **Sensitive populations such as children, seniors, and people with pre-existing heart or lung problems are more prone to suffer health effects when exposed to diesel exhaust, such as heart attacks and premature death**
- **U.S. EPA is establishing a comprehensive program that will integrate the regulation of heavy-duty vehicles and the fuels into a single system**
- **New emissions standards will take effect in 2007 for heavy-duty engines and vehicles and will employ catalytic emission control devices or other effective advanced technologies**
- **The level of sulfur in diesel fuel is required to be reduced by 97% by mid-2006**

# Indiana's Diesel Initiative

- Over \$700,000 secured and dedicated thus far for diesel retrofit projects for the next year.
- Projects underway in Marion, Lake, Porter and Vanderburgh counties:
  - Washington Township Schools - \$40,000
  - Additional Township Schools - \$135,000
  - IndyGo Green Fleet - \$150,000
  - City of East Chicago – \$60,000
  - Portage Township Schools \$21,000
  - Evansville School Corporation – \$75,000
- Working with other state, municipal, and public transportation entities
- State quantity purchase award for diesel oxidation catalysts
- \$840 per unit; average cost on the market is between \$1,000 and \$1,500
- Any state agency, municipality or sub-group of either is eligible to purchase through the state QPA
- QPA Link: <http://www.in.gov/idoa/proc/qpa.html>

# Indiana's Diesel Initiative

## Anti-Idling Policy

- School Transportation Association of Indiana (STAI) – 90% of school bus corporations belong
- Majority have adopted the anti-idling policy

## NW Indiana travel center electrification project:

- Partnership (public/private) pilot project.
- \$375,000 dedicated from a combination of five entities/funding sources.

## Education Outreach:

- Closely tied to ozone and PM 2.5 planning efforts
  - SW IN Idling and U.S. EPA SmartWay Transport Partnership
  - *DieselWise* -IDEM's website concerning all things diesel



<http://www.in.gov/idem/air/dieselwise/index.html>



## Health Effects

- What are they?
- Who is at risk?
- How to avoid them



## Idling

- Anti-idling Toolkit
- Facts and Myths



## What's Underway in Indiana?

- Education/Awareness
- Municipal, School, and Public Transportation Projects
- STAI School Bus Idling Policy
- Truck Stop Electrification



## Public/School Transportation

- How can school fleets minimize diesel emissions?



## Fuel Alternatives/Options

- Alternative Fueled Vehicles
- Biodiesel
- Condensed Natural Gas
- Propane/Liquefied Petroleum Gas
- Ultra Low Sulfur Diesel (ULSD)

## Where Can I Find More Information?

### 8-Hour Ozone Standard:

<http://www.in.gov/idem/air/8hourstandard/index.html>

### PM 2.5 Standard:

<http://www.in.gov/idem/air/pm25standard/index.html>

### Central Indiana Air Quality Advisor Group:

<http://www.in.gov/idem/air/ciaqag/index.html>

### DieselWise:

<http://www.in.gov/idem/air/dieselwise/index.html>

## Contacts

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